REMARKS

This application has been carefully reviewed in light of the Office Action dated September 21, 2009. Claims 1, 7, 13 and 25 to 29 are pending in the application, with Claims 3, 9, 15 and 30 having been cancelled herein. Claims 1, 7, 13 and 25 to 27 are independent. Reconsideration and further examination are respectfully requested.

In the Office Action, Claims 1, 3, 7, 9, 13, 15, 28 and 30 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,142,374 (Tajika) in view of U.S. Patent No. 5,708,728 (Nomura), Claim 29 was rejected under § 103(a) over Tajika in view of Nomura and further in view of U.S. Patent No. 6,328,404 (Fujimori), Claim 30 was rejected under § 103(a) over Tajika in view of Nomura and further in view of U.S. Patent No. 6,614,556 (Hong), and Claims 25, 26 and 27 were rejected under § 103(a) over Tajika in view of Nomura and Fujimori. Reconsideration and withdrawal of these rejections is respectfully requested.

The claims generally concern error diffusion processing on color data having different densities. According to the claims, one of two different types of error diffusion processes are executed. A first error diffusion process is executed to a first density component using at least one of a modulated quantization threshold value and a modulated quantization diffusion coefficient, and a second error diffusion process is executed to a second density component using a fixed modulated quantization threshold value and a fixed modulated quantization diffusion coefficient, where the first and second density components have respective different component types and where one dot (droplet) output based on the first density component has a lower density (smaller size) than one dot (droplet) output based on the second density component.

Referring specifically to the claims, Claim 1 is directed to an image processing apparatus for executing an error diffusion process to color data having a plurality of density components, including at least first and second density components, comprising a processor and a memory, a first processing unit that modulates at least one of a quantization threshold value and a quantization diffusion coefficient on the basis of the first density component, and executes the error diffusion process to the first density component by using at least one of the modulated quantization threshold value and the modulated quantization diffusion coefficient, a second processing unit that executes the error diffusion process to the second density component by using a fixed modulated quantization threshold value and a fixed modulated quantization diffusion coefficient, where the error diffusion process executed by the second processing unit requires a lighter processing load than the error diffusion process executed by the first processing unit and an error diffusion processing control unit that controls to execute, by the first processing unit, the error diffusion process to the first density component, and controls to execute, by the second processing unit, the error diffusion process to the second density component, where the first and second density components have respective different component types and where one dot output based on the first density component has a lower density than one dot output based on the second density component, where the modulated quantization diffusion coefficient is used to diffuse an error caused by a quantization process which is performed using the modulated quantization threshold value to neighboring pixels, and where the fixed modulated quantization diffusion coefficient is used to diffuse an error caused by a quantization process which is performed using the fixed modulated quantization threshold value to neighboring pixels.

Claims 7 and 13 are method and computer-readable storage medium claims, respectively, that substantially correspond to Claim 1.

Similar to Claim 1, Claim 25 is directed to an image processing apparatus for executing an error diffusion process to color data having a plurality of density components, including at least first and second density components, comprising a processor and a memory, a first processing unit that modulates at least one of a quantization threshold value and a quantization diffusion coefficient on the basis of the first density component, and executes the error diffusion process to the first density component by using at least one of the modulated quantization threshold value and the modulated quantization diffusion coefficient, a second processing unit that executes the error diffusion process to the second density component by using a fixed modulated quantization threshold value and a fixed modulated quantization diffusion coefficient, where the error diffusion process executed by the second processing unit requires a lighter processing load than the error diffusion process executed by the first processing unit, and an error diffusion processing control unit that controls to execute, by the first processing unit, the error diffusion process to the first density component, and controls to execute, by the second processing unit, the error diffusion process to the second density component, where the first and second density components have respective different component types and where one droplet output based on the first density component has a smaller size than one droplet output based on the second density component, where the modulated quantization diffusion coefficient is used to diffuse an error caused by a quantization process which is performed using the modulated quantization threshold value to neighboring pixels, and where the fixed modulated quantization diffusion coefficient is

used to diffuse an error caused by a quantization process which is performed using the fixed modulated quantization threshold value to neighboring pixels.

Claims 26 and 27 are method and computer-readable storage medium claims, respectively, that substantially correspond to Claim 25.

The applied art, alone or in any permissible combination, is not seen to disclose or to suggest the features of Claims 1, 7, 13 and 25 to 27 and, in particular, is not seen to disclose or to suggest at least the features of i) a first processing unit (step) that modulates at least one of a quantization threshold value and a quantization diffusion coefficient on the basis of the first density component, and executes the error diffusion process to the first density component by using at least one of the modulated quantization threshold value and the modulated quantization diffusion coefficient, ii) a second processing unit (step) that executes the error diffusion process to the second density component by using a fixed modulated quantization threshold value and a fixed modulated quantization diffusion coefficient, where the error diffusion process executed by the second processing unit requires a lighter processing load than the error diffusion process executed by the first processing unit, and iii) an error diffusion processing control unit (step) that controls to execute, by the first processing unit, the error diffusion process to the first density component, and controls to execute, by the second processing unit, the error diffusion process to the second density component, where the first and second density components have respective different component types and where one dot (droplet) output based on the first density component has a lower density (smaller size) than one dot (droplet) output based on the second density component, where the modulated quantization diffusion coefficient is used to diffuse an error caused by a quantization process which is

performed using the modulated quantization threshold value to neighboring pixels, and where the fixed modulated quantization diffusion coefficient is used to diffuse an error caused by a quantization process which is performed using the fixed modulated quantization threshold value to neighboring pixels.

Tajika is seen to disclose an error diffusion method and various binarization methods for dark and light inks. Specifically, Tajika is seen to teach switching between two binarization methods based on the characteristics of the ink being processed. In this regard, Tajika applies the bayer type dither to dark ink and the halftone type dither to light ink (Fig. 1). Further, Tajika applies the error diffusion method to dark ink and the density pattern method to light ink (Fig. 4). Thus, by switching between different binarization methods, Tajika emphasizes the ability to produce a better resolution for dark ink (col. 4, lines 45-51) and a better gradient expression for light ink (col. 4, lines 51-57). However, Tajika is not seen to disclose the type of error diffusion method used. In other words, Tajika is not seen to specify whether it relies on at least one of the modulated quantization threshold value and the modulated quantization diffusion coefficient or whether it relies on a fixed modulated quantization threshold value and a fixed modulated quantization diffusion coefficient. Furthermore, Tajika is not seen to teach switching between the two binarization methods such that one dot output based on the first density component has a lower density than one dot output based on the second density component.

Nomura is seen to disclose a binarization method having a predetermined threshold and a matrix of diffusion coefficients, i.e., a fixed type error diffusion method. However, Nomura is not seen to teach anything that, when combined with Tajika, would have resulted in the features of a first processing unit that modulates at least one of a

quantization threshold value and a quantization diffusion coefficient on the basis of the first density component, and executes the error diffusion process to the first density component by using at least one of the modulated quantization threshold value and the modulated quantization diffusion coefficient, a second processing unit that executes the error diffusion process to the second density component by using a fixed modulated quantization threshold value and a fixed modulated quantization diffusion coefficient, where the error diffusion process executed by the second processing unit requires a lighter processing load than the error diffusion process executed by the first processing unit, and an error diffusion processing control unit that controls to execute, by the first processing unit, the error diffusion process to the first density component, and controls to execute, by the second processing unit, the error diffusion process to the second density component, where the first and second density components have respective different component types and where one dot output based on the first density component has a lower density than one dot output based on the second density component, where the modulated quantization diffusion coefficient is used to diffuse an error caused by a quantization process which is performed using the modulated quantization threshold value to neighboring pixels, and where the fixed modulated quantization diffusion coefficient is used to diffuse an error caused by a quantization process which is performed using the fixed modulated quantization threshold value to neighboring pixels.

Fujimora is seen to disclose a printing apparatus and method capable of expressing a plurality of tone values in an image (Abstract). In more detail, Fujimora is seen to teach creation of variable-sized dots by changing the number of driving waveforms used for creating the dot (col. 19, lines 20-22). The proposed combination of Tajika,

Nomura, and Fujimora is not seen to disclose a first processing unit that modulates at least one of a quantization threshold value and a quantization diffusion coefficient on the basis of the first density component, and executes the error diffusion process to the first density component by using at least one of the modulated quantization threshold value and the modulated quantization diffusion coefficient, a second processing unit that executes the error diffusion process to the second density component by using a fixed modulated quantization threshold value and a fixed modulated quantization diffusion coefficient, where the error diffusion process executed by the second processing unit requires a lighter processing load than the error diffusion process executed by the first processing unit, and an error diffusion processing control unit that controls to execute, by the first processing unit, the error diffusion process to the first density component, and controls to execute, by the second processing unit, the error diffusion process to the second density component, where the first and second density components have respective different component types and where one droplet output based on the first density component has a smaller size than one droplet output based on the second density component, where the modulated quantization diffusion coefficient is used to diffuse an error caused by a quantization process which is performed using the quantization threshold value to neighboring pixels, and where the fixed modulated quantization diffusion coefficient is used to diffuse an error caused by a quantization process which is performed using the fixed modulated quantization threshold value to neighboring pixels.

In view of the foregoing amendments and remarks, Claims 1, 7, 13 and 25 to 27, as well as the claims dependent therefrom, are believed to be allowable.

No other matters having been raised, the entire application is believe to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicant's undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

/Edward A. Kmett/

Edward A. Kmett
Attorney for Applicant
Registration No.: 42,746

FITZPATRICK, CELLA, HARPER & SCINTO
1290 Avenue of the Americas
New York, New York 10104-3800
Facsimile: (212) 218-2200

FCHS_WS 4428027v1